Food-Processing Industry Resource Efficiency Program
Steam Systems Best Practices
Streaming Video Project
March through December 2005

Purpose

By watching this video:

- Industrial managers will become aware of products and services from the Industrial Efficiency Best Practices program. Managers will be encouraged to send plant personnel to attend training workshops.
- Plant personnel will learn basic principles and performance improvement opportunities in steam systems.

Shoot Location:

Yet to be determined, may need to purchase existing film

Target Audience:

This video has two different audiences and messages. The first audience is the plant managers and supervisors who may stream the video from their office computers. They will be asked to see the video not for technical content but to encourage them to send their steam system operators to attend Best Practices workshops. They will also be asked to invite steam room operators to watch the video in their offices or other training/meeting opportunities.

Production Considerations

The video will include a narration describing the basic elements of a steam system. In five to seven minutes, the trainer (Riyaz Papar) will make emphasis about whole system considerations and improvements to reduce operating costs.

The trainer will point out that upstream inefficiencies will affect process heating and cost of producing steam; while downstream inefficiencies (leaks, bad traps, and poor load control) can also affect process heating and have severe effects on the boiler and cost of producing steam.

The trainer will also provide example opportunities for savings, such as:

- Steam Generation through cogeneration applications, boiler controls, and water treatment;
- Steam Distribution through checking steam leaks, installing insulation and proper steam trap maintenance;
- Steam End Use through heat exchanger maintenance;
- Steam Recovery through condensate return.
- Ways to determine the cost effectiveness of any work done and suggestions as to how to present to decision makers.

Each of these savings opportunities will require a visual description that may include video footage from the steam room, graphics and text.

Total Run Time: Approximately 7 minutes

Desired Outcomes

Know

- Who we are.
- What we are doing to prepare industrial steam system end-users be more efficient.
- Best Practices Program, with descriptions of all offerings, and schedules.

Feel

- The Best Practices Program has an effective and tested training curriculum.
- The Best Practices Program is known for focusing on cost-effective solutions.

Do

- Viewers will support a company policy to promote energy efficiency.
- Viewers will understand that the Best Practices Program is an invaluable and powerful program to take advantage from.

SCRIPT

Audio	Video
Title: **Introduction – Ricardo:** Hello I'm Ricardo Amon with the California Energy Commission. This short video presentation has two goals, the primary goal is to introduce you and other Industrial managers to the products and services available from the "U.S. Department Of Energy Industrial Efficiency Best Practices Program". These services include our series of certified training workshops. We hope you agree that a skilled worker using Best Practices will improve productivity and reduce production costs. Please share this presentation with other plant personnel. The second goal is to assist plant personnel in learning basic principles and performance improvement opportunities in steam systems. We will identify basic management principles for industrial steam system operators. _____ **Ricardo:** With me today is Mr. Riyaz Papar. Riyaz is a US Department of Energy Steam Systems Best Practices Qualified Specialist. Mr. Papar will help us identify the step-by-step method to optimize industrial steam systems. _____ **Riyaz:** We're going to use a systems approach to inform your plant personnel on basic steps to optimize their steam systems.	**Computer Graphics:** **"U.S. Department Of Energy Industrial Efficiency Best Practices Program". Step-by-step method to optimize industrial steam systems.** Close view of Ricardo sitting at a desk. C.G.: Ricardo Amón **C.G. : Food-Processing Industry Resource Efficiency Program** **Steam Systems Best Practices** _____ Medium-far shot of Ricardo and Riyaz in front of a boiler room or at some industrial location or in front of the energy commission building, etc. **C.G. : step-by-step method to optimize industrial steam systems.** _____

	C.G.: Mr. Riyaz Papar US Department of Energy Steam System Qualified Specialist Close view of Riyaz in front of steam plant.
Let us take a look at a generic industrial steam system flow diagram. All steam systems include four component areas: Generation Distribution End Use and Recovery	**Computer Graphic:** **Show Figure 1. Pg. 4 (Steam System Schematic) from the Steam System Sourcebook.** **Highlight Generation area** **Highlight Distribution area** **Highlight End-Use area** **Highlight Recovery area**
The primary components in the Generation area are the steam boilers. There are two basic types of boilers: Fire-tube & Water-tube The fire-tube boiler has combustion gases on the tube-side and steam is generated on the shell side Contrary to the fire-tube boiler, the water-tube boiler has steam generation on the tube-side and combustion gases on the shell side	#3 – 01:20:20-01:20:29 – Steam boiler **Computer Graphic:Show Figure 2. Pg. 5 (Fire-tube boiler) from the Steam System Sourcebook.** **With a cursor pointing to the open tubes.** **With a cursor pointing to the steam on the outlet.** **Computer Graphic: Show Figure 3. Pg. 6 (Water-tube boiler) from the Steam System Sourcebook.** **With a cursor pointing to the cut tubes in the middle.** **With a cursor pointing to the flat inside surface**
Regardless of the type of boilers you use, the operating cost of a steam system depends strongly on boiler efficiency. Ensure that the boilers are operating at their highest levels of efficiency.	#3 – 01:19:55-01:20:11 – Steam boiler
To minimize boiler efficiency losses, we will identify the most common performance improvement opportunities.	#1 – 01:01:58-01:02:03 – Steam boiler
Minimize excess air by using automatic oxygen trim controllers	**C.G. : "Minimize excess air"**

Install heat recovery equipment to reduce flue gas exhaust temperature	**C.G.: "Install heat recovery equipment"**
Manage and control blowdown with necessary and sufficient pre-treatment of water	**C.G.: "Manage blowdown with pre-treatment of water"** #3 – 01:18:49-01:19:00 – WaterTreatment #3 – 01:19:05-01:19:12 – WaterTreatment #3 – 02:01:58-02:02:02 – Softeners
Recover energy from boiler blowdown by installing a blowdown flash tank and/or a blowdown heat recovery exchanger	**C.G. : "Recover energy from boiler blowdown"** #1 – 01:01:58-01:02:03 – Automatic BD control #3 – 02:01:28.11-02:01:33 – Blowdown HX
Add and/or restore boiler insulation to minimize shell losses	**C.G.: "Restore boiler insulation to minimize shell losses"** #1 – 01:01:58-01:02:03 – Steam boiler
Some of the components of the Distribution area include:	**Computer Graphic: Show Figure 1. pg. 4 (Steam System Schematic) from the Steam System Sourcebook.**
Piping and insulation,	#3 – 01:21:18-01:21:20 – Pipes distribution #3 – 01:22:56-01:23:07 – Pipes distribution
Steam traps and	#3 – 01:26:54.17-01:27:09.25 – Steam Trap
Pressure reducing valves.	
To minimize steam distribution losses, there are several common performance improvement opportunities	#3 – 01:23:31-01:23:40 – Pipes distribution
Repair steam leaks and minimize vented steam to avoid steam loss	**C.G.: "Repair Steam Leaks"**
Implement a steam trap maintenance program that includes: 1. Testing each trap at least once a year for performance by trap type 2. Maintain a steam trap database 3. Provide training opportunities	**Computer Graphic:** **"Steam Trap Program"** **"Annual Testing of Steam Traps"** **"Steam Trap Database"** **"Staff Training"** #3 – 01:27:16-01:27:26 – Steam Traps

Ensure that the steam distribution system is properly insulated and maintained. This will reduce energy loss from piping and equipment surfaces	**C.G.: "Insulation"** #3 – 01:26:35-01:26:42 – Insulation #3 – 01:24:19-01:24:25 – Insulation
I will now briefly cover the End-Use area of the steam system Common end use equipment includes heat exchange devices such as evaporators, process heaters, retorts and dryers Other end-use equipment includes steam turbines that convert thermal energy into shaft power	**Computer Graphic:** **Show Figure 1. pg. 4 (Steam System Schematic) from the Steam System Sourcebook.** **Highlight shell and tube heat exchanger and the process heater in the End Use area.** **C.G.: "Combined Heat & Power"**
Because end-use performance improvement opportunities are so application specific to your facility, I suggest that you explore them with your process personnel.	
Condensate recovery is the final area of the steam system Some of the components of the condensate recovery area are: Condensate Receivers Condensate Pumps Flash Steam Vessels	**Computer Graphic:** **Show Figure 1. pg. 4 (Steam System Schematic) from the Steam System Sourcebook. Highlight pipes after steam traps, pump and piping up to the deaerator.** **Show Figure 13. pg. 22 (Steam System Schematic) from the Steam System Sourcebook.** #3 – 01:24:39-01:24:40 – Condensate Receiver / DA #3 – 01:26:21-01:26:26 – Pumps **Show Figure 14. pg. 23 (Steam System Schematic) from the Steam System Sourcebook**
Some common performance improvement opportunities in the condensate recovery area are:	

Maximize condensate recovery to capture thermal energy and reduce make up water thereby saving energy, water, chemical pre-treatment costs and sewer costs Use high pressure condensate to make low pressure steam	**C.G.: "Recover available energy and reduce make-up water costs by increasing condensate recovery"**
Transition Panel	
Ricardo: We have spoken about best practices to improve steam system performance. We will now identify ways to determine the cost effectiveness of these opportunities. We will provide some suggestions for managers to consider these projects.	Close view of Ricardo.
Riyaz: As you know, cost savings drives all your decisions to making investments in your plant. Implementing steam system best practices will achieve significant cost savings.	Close Shot of Riyaz
Energy savings is only a part of the total cost savings. There are several other components to cost savings including: Improved system reliability Reduced maintenance hours Increased productivity Improved quality of product due to steady and uniform temperatures and pressures Reduced unplanned shutdowns Lastly, applying BestPractices in your facility may	Close Shot of Riyaz **Computer Graphics**: **The other contributors are:** **System reliability improves significantly** **Total maintenance hours are reduced** **Increase in productivity** **Improved quality of product due to steady and uniform temperatures and pressures** **Avoid unplanned shutdowns** Close Shot of Riyaz

help you comply with air quality regulations	
The US Department of Energy, in partnership with Industry, has developed BestPractices software tools and resources to help you quantify energy savings to determine cost effectiveness.	View of Riyaz
They include: Tip sheets For example, there is a tip sheet on inspecting and repairing steam traps that helps you to estimate the expense of the steam lost due to failed steam traps Technical Case studies Steam System Sourcebook The sourcebook is a concise guide and compendium of performance improvement opportunities and all the resources and commercially available tools Steam System Survey Guide The survey guide provides fundamental information on steam system operations Steam System Scoping Tool (SSST) This is a management tool to help you determine 20% of the most cost effective opportunities in each of the four component areas that can result in 80% of the potential savings Steam System Assessment Tool (SSAT) This tool will build a model of your steam system and allow you to evaluate energy and cost saving projects such as cogeneration, heat recovery and increasing boiler efficiency. 3E-Plus This software determines the thermal cost effectiveness of insulation in your steam system	Shot of a tip sheet **C.G.: tip sheet** Shot of Technical Case studies **C.G.: Technical Case studies** Shot of Steam System Sourcebook **C.G.: Steam System Sourcebook** Shot of System Survey Guide **C.G.: System Survey Guide** Shot of Steam System Scoping Tool SSST) **C.G.: Steam System Scoping Tool (SSST)** Shot of Steam System Assessment Tool (SSAT) **C.G.: Steam System Assessment Tool (SSAT)** Shot of 3E-Plus **C.G.: 3E-Plus** Show Figure 1. Pg. 4 (Steam System Schematic) from the Steam System Sourcebook.
Bryan:	Shot of Ricardo Calendar of events, visual of a class

I am a Southern California Gas Company representative and it is our goal to work closely with the California Energy Commission in assisting companies become energy efficient. We recommend that all of our customers take advantage of the Best Practices Tools and Resources. **Ricardo:** By attending Best Practices Training programs, you and your staff can get a first-hand experience on how to use these tools and resources.	#2 – 02:19:14-02:19:22 – Classroom Training View of Ricardo
Riyaz: Remember, you cannot optimize what you do not measure and you cannot save when you do not optimize your systems	
Ricardo: For additional information on Best Practices Tools and Resources please visit this web link: www.eere.energy.gov/industry/bestpractices/	www.eere.energy.gov/industry/bestpractices/

rpapar 11/
Deleted: